

## **Municipal Facilities Operation & Management: 2.1.10 Low Flow Diversion System**

### **2.1.10.1 Introduction**

The City of San Diego is a leader in low flow storm drain diversion technology due to its experience with the Mission Bay system, which has been operational for more than fifteen years. The goal of the low flow diversion facilities is to protect the beneficial use of Recreational 1 or in other words eliminate a bacterial contamination source at our local beaches. This component applies to the departments that manage Capital Improvement Program (CIP) projects, operate and maintain the low flow diversion facilities, and maintain the storm drain system upstream of the diversion facilities.

The applicable San Diego Municipal Storm Water Permit requirements are described in Table 2.1.10-1.

**Table 2.1.10-1 - Permit Requirements – Low Flow Storm Drain Diversion.**

<b>Section</b>	<b>Requirement (Summary)</b>	<b>Permit Section</b>
2.1.10.2	Implement control measures to reduce pollutants in urban runoff discharges	C.2
2.1.10.3	Develop a budget for storm water expenditures for each fiscal year covered by the Municipal Permit	F.8
2.1.10.4	Document activities for Jurisdictional Urban Runoff Management Program Annual Report	I

The objectives of the low flow storm drain diversion program are as follows:

- To intercept low dry weather flows from storm drains and divert them to the sanitary sewer system
- To intercept sewage overflows during dry weather conditions on storm drain outlets to prohibit sewage from reaching public waters
- To improve the water quality of Mission Bay and Coastline beaches
- To protect the existing beneficial use for Contact Recreation (REC-1) and public health of beachgoers
- To optimize the operation of the low flow diversion facilities
- Identify a phased implementation schedule and associated estimated costs needed to implement this component through the five-year life of the Municipal Permit
- Document activities for Jurisdictional Urban Runoff Management Program Annual Report

## Background

The City of San Diego has been concerned about the water quality of our coastal beaches for decades. In 1979, a report, entitled *Mission Bay Waste Assimilation Study* by Hirsch and Company, was conducted to identify bacterial pollutant sources.

During dry weather, intermittent flows of urban runoff enter receiving waters through storm drains. These dry weather flows contain undocumented wastes and sewage overflows from broken, vandalized, or clogged sewer mains. Unfortunately, tidal flushing within Mission Bay is not thorough, allowing pollution to linger, and occasionally, causing bacterial concentrations in the Bay to increase to a level which excludes bodily contact. This resulted in short-term use prohibitions of affected areas of the Bay and beaches. In addition, tidal action links Mission Bay with the adjacent San Diego River Channel, allowing the water quality of one to impact the other.

To address the problem of water quality in Mission Bay, in 1981, the City retained the services of Tetra Tech, Inc. of Pasadena, California, to conduct a comprehensive study of pollution sources within the Bay and to analyze circulation and tidal flushing action with a view towards improving the dispersal of pollutants- especially those contributed to dry weather runoff. Computer and physical modeling of the Bay as performed by Tetra Tech indicated that the major reconfiguration of the Fiesta Island or removal of the causeway would not significantly improve the tidal flushing of the Bay. Interception of pollutants before they reach the Bay was predicted to provide the most effective means of long-term improvement of Bay water quality. This recommended approach was subsequently implemented with the construction of eight diversion systems on two contributory drainage control channels (Rose and Tecolote Creeks) and nine storm drains on the east side of Mission Bay. These first diversion projects were simple gravity and pumped systems which allowed a controlled amount of low-flow runoff from the storm drains to enter an existing trunk sewer and to then be transported to the Point Loma Treatment Plant for treatment. Approval from the California Regional Water Quality Control Board and the EPA was required.

While it is not normally desirable to allow separate storm drains to connect to a wastewater collection system, in this case the incremental increase in flow compared to the total amount of wastewater processed at the time, 140 MGD, was very small. The capacity of the initial "cross connections" ranged from 200 to 500 gallons per minute. The controls were manual and whenever rain was forecast, City crews would be dispatched to shut down all eight facilities. The East Bay project was completed in 1986 at a cost of \$1 million and provided low flow storm drain diversion of runoff from 90 percent of the area tributary to Mission Bay and the San Diego River Channel west of Interstate 5.

In 1987, the City committed to expand the low flow diversion system around Mission Bay with the Mission Bay Sewage Interceptor System (MBSIS) project. The project provided interception capability for 65 drain outlets within the remaining 10 percent of the tributary drainage basin. At a cost of \$9 million, the project was completed in 1994 and expanded the number of facilities to 46 (14 pump stations and 32 gravity systems). A telemetry control system was also included to provide a more efficient operation. The remote telemetry automatically was used to shutdown each facility whenever it rains. Therefore, the labor-intensive effort of physically shutting down each facility was avoided. Also, the new storm water pumping station constructed in Mission Beach at Santa Clara Point was constructed with low flow pumps to divert dry weather flows to the wastewater collection system.

In 1997, the Beach Area Low Flow Diversion Project was created at the request of Councilmembers Wear and Mathis. Storm drain outfalls along the coastline were inventoried and each drain outfall was rated for the potential for human contact with the flow from the drain (i.e. flow crosses the beach). Outfalls, which were labeled by the street name location, were identified as having high or medium potential were studied to determine the feasibility and cost of diverting low flows to the wastewater collection system. High priority sites due to continuous urban runoff flows during dry weather became Phase I of the project. As a result, low flow diversion facilities at Tourmaline, Bonair, Ravina, Avenida de la Playa, Vallecitos, Camino del Oro, and south of Vista de la Playa became operational in 1998 and 1999 at a cost of \$1 million.

#### **2.1.10.2 Activities**

##### Current Capital Improvements Program

There are currently nine (9) low-flow diversion facilities in operation within the City. These facilities were constructed as part of Phase I facilities shown in Table 2.1.10-2, “Existing and Scheduled Low Flow Diversion System Facilities.”

##### *New Diversion Facilities*

Under the current capital program, more coastal storm drain outfalls are planned for design and construction. These sites are grouped into phases II, III and IV in Table 2.1.10-2. These planned improvements entail the construction of 18 sites under Phase II of the program at a cost of about \$2.8 million, and the design and construction of 9 sites under Phase III of the program for a combined cost of about \$2.1 million. 14 additional sites under a Phase IV of the program have been identified and are planned for inclusion into the CIP program for a combined design and construction cost of about \$3.3 million. The planned new diversion facilities and modifications to existing facilities identified in Tables 2.1.10-2 and 2.1.10-3,

respectively, are current at the time of printing and subject to change.

**Table 2.1.10-2. Existing and Scheduled Low Flow Diversion System Facilities.**

<b>Phase I</b>				
<b>No.</b>	<b>Facility ID</b>	<b>Location</b>	<b>Facility</b>	<b>Beach</b>
1	DV-01	Tourmaline Canyon	Gravity	Tourmaline Surf Park
2	DV-03	Avenida De La Playa	Gravity	La Jolla Shores
3	DV-04	Vallecitos	Gravity	La Jolla Shores
4	DV-05	Camino Del Oro	Gravity	La Jolla Shores
5	DV-26	S Vista De La Playa	Gravity	Wind'N Sea
6	IPS-20	Bonair/Neptune Place	Pumped	Wind'N Sea
7	IPS-21	Ravina St / Coast Blvd	Pumped	Wispering Sands Beach
8	n/a	Nicholson Point	Percolation Pit	Wispering Sands Beach
9	n/a	Avenida De La Playa Outfall	Outfall Box	La Jolla Shores
<b>Phase II</b>				
<b>No.</b>	<b>Facility ID</b>	<b>Location</b>	<b>Facility</b>	<b>Beach</b>
1	n/a	Ocean Boulevard and Grand Ave	Gravity	Pacific Beach
2	n/a	Neptune Place at Palomar Ave	Gravity	Wind'N Sea
3	n/a	Neptune Place at Rosemont St	Gravity	Wind'N Sea
4	n/a	Neptune Place at Kolmar St	Gravity	Wind'N Sea
5	n/a	Neptune Place at Gravilla St	Gravity	Wind'N Sea
6	n/a	Neptune Place at Playa Del Sur	Gravity	Wind'N Sea
7	n/a	Neptune Place at Playa Del Norte	Gravity	Wind'N Sea
8	DV-11	Neptune Place at Westbourne St	Gravity	Wind'N Sea
9	DV-12	Neptune Place at Belvedere St	Gravity	Wind'N Sea
10	DV-18	711 Coast Boulevard	Gravity	South Casa Beach
11	DV-24	Children's Pool	Gravity	South Casa Beach
12	DV-25	Spindrift Ave at Roseland Dr	Gravity	South of La Jolla Shores
13	DV-27	Coast Boulevard at SPS24	Gravity	Wispering Sands Beach
14	DV-28	465 Coast Boulevard	Gravity	South Casa Beach
15	IPS-16	Coast Boulevard (Grand Ave S)	Pumped	Pacific Beach
16	IPS-19	Neptune Pl, N of Kolmar St	Pumped	Wind'N Sea
17	IPS-22	Coast Boulevard, S of Lifeguard Sta	Pumped	South Casa Beach
18	IPS-23	El Paseo Grande N of Camino Del Collado	Pumped	La Jolla Shores

**Table 2.1.10-2. Existing and Scheduled Low Flow Diversion System Facilities.**

<b>Phase III</b>				
<b>No.</b>	<b>Facility ID</b>	<b>Location</b>	<b>Facility</b>	<b>Beach</b>
1	DV-07	Missouri St	Gravity	Pacific Beach
2	DV-08	Chalcedony St	Gravity	Pacific Beach
3	DV-09	Law St	Gravity	Pacific Beach
4	DV-10	Chelsea Ave	Gravity	Tourmaline Surf Park
5	DV-16	Marine	Gravity	Marine Street Beach
6	DV-22	Fern Glen	Gravity	Wind'N Sea
7	IPS-15	Point Loma Ave	Pumped	Point Loma
8	IPS-17	Felspar Ave	Pumped	Pacific Beach
9	IPS-18	South of Loring St	Pumped	Pacific Beach
<b>Phase IV</b>				
<b>No.</b>	<b>Facility ID</b>	<b>Location</b>	<b>Facility</b>	
1	TBD	La Verada S of Camino del Oro	TBD	
2	TBD	La Verada N of Vallecitos	TBD	
3	TBD	S of Avenida de La Playa at La Verada	TBD	
4	TBD	Camino del Sol	TBD	
5	TBD	Princess St and Spindrift Dr	TBD	
6	TBD	Torrey pined Rd E of Amalfi St	TBD	
7	TBD	Torrey pined Rd E of Coast Walk	TBD	
8	TBD	Coast Walk	TBD	
9	TBD	Prospect St and Park Row	TBD	
10	TBD	Prospect St and Cave St	TBD	
11	TBD	Coast Blvd (Goldfish Point)	TBD	
12	TBD	Coast Blvd S of Coast Blvd South	TBD	
13	TBD	Chelsea St S of Linda Way	TBD	
14	TBD	Ocean Blvd N of Crystal Dr	TBD	

### *Modify Existing Facilities*

The current CIP program includes upgrades to the existing Mission Bay Sewer Interception System (MBSIS) low flow diversion facilities. Additionally, the current CIP program provides for the design and construction of upgrades to the existing 36 diversion valves and 14 interceptor pump stations of the MBSIS, as shown in Table 2.1.10-3, "Mission Bay Sewer Interceptor System Listing of Facilities Sited for Improvements". The upgrades are intended to improve the operation of the system and lessen maintenance costs.

**Table 2.1.10-3. Mission Bay Sewer Interceptor System Listing of Facilities Sited for Improvements.**

Number	Diversion Valves	Interceptor Pump Stations
1	V-2	I-1
2	V-5	I-2
3	V-6	I-3
4	V-9/98	I-4
5	V-10	I-5
6	V-13	I-6
7	V-14	I-7
8	V-15	I-8
9	V-17	I-9
10	V-19	I-10
11	V-19A	I-11
12	V-20	I-12
13	V-21	I-13
14	V-30	I-14
15	V-32	
16	V-33	
17	V-38	
18	V-40	
19	V-42	
20	V-43	
21	V-44	
22	V-55	
23	V-56	
24	V-60	
25	V-60A	
26	V-61	
27	V-62	
28	V-67/68	
29	V-69	
30	V-70	
31	V-71	
32	V-72A/B	
33	V-73	
34	V-76A	
35	V-76B	
36	V-76D	

### *COMNET*

The coastal low flow diversion facilities are intended to be controlled remotely by the Metropolitan Wastewater Department's SCADA telemetry system. The existing low flow diversion facilities of Phase I will be on-line in the Summer of 2002 for remote monitoring and operation. COMNET will enable City crews to receive "alarms" notifying of rain events or sewer spills at the site of the on-line low flow diversion facility. COMNET will also allow crews to operate the facilities remotely, thereby significantly increasing reaction time and reducing related field trips.

The current design efforts under the COMNET component of the coastal low flow diversion program provides for the remote monitoring and operation of the low flow diversion facilities of Phases II, III and IV once they are operational.

### *Federal Grants*

Three Congressional Federal Grants were issued through EPA's Appropriations Act totaling approximately \$6 million. These grants fund 55% of the construction costs of Phases II, III and IV. In order to be eligible for these federal grants, each of the phases must clear the EPA's National Environmental Policy Act (NEPA), a process that can span up to a year.

### Operation and Maintenance

Metropolitan Wastewater Department crews are responsible for the operation and maintenance of the existing MBSIS and Phase I low flow diversion facilities along the coast as well as all planned low flow diversion facilities under Phase II, III and IV. This includes the removal and proper disposal of debris collected at each of the facilities, the monitoring and data collection of sites operation through the use of field observations and COMNET records, and the as needed maintenance of the facilities.

Transportation Department (Street Division) crews are responsible for the operation and maintenance of the storm drain system upstream and downstream of the low flow diversion facilities. This includes drain cleaning, removal and disposal of debris. Since debris is a major nuisance for the low flow diversion facilities and its excess can render the facilities in-operational, regular and thorough cleaning is a necessity. Street Division crews' area of responsibility spans the entire City's storm drain system and strains the amount of resources available to regularly service the low flow diversion areas. New resources are needed to support the requirements of the existing and future low flow diversion facilities. More details regarding storm drain maintenance are included in Component 2.1.11 Storm Water Conveyance System.

### *East MBSIS Effectiveness Study*

A study was conducted by Advanced Infrastructure Systems in the summer of 2001 to

verify the effectiveness of the East Mission Bay Sewage Interceptor System (EMBSIS). The study involved a two month field observations of the operation and maintenance of the eighteen (18) EMBSIS low flow diversion facilities. The purpose of the study was to identify areas of improvements needed in the existing facilities in order to ensure optimal operational efficiency and effectiveness. The study determined that the 18 facilities of EMBSIS were operating effectively as designed. Several facility improvement items were sited and are planned as part of the MBSIS capital improvement program.

#### Monthly Coordination Meeting

During project design, various factors impacting the low flow diversion systems and the wastewater collection system were identified and addressed by design consultants. Engineers and operators worked cooperatively throughout the project. Upon completion of the initial phase of MBSIS construction, an informal task force, consisting of City operations and engineering staff, was created and met routinely for over two years. The task force was reinacted shortly after the Coastal low flow diversion project was initiated and will continue to meet until all phases of the project are operational. The primary objective of this task force has been to improve the overall operation of the systems but they have also facilitated the correction of minor deficiencies, programmed maintenance, and the identification and resolution of equipment problems.

At these monthly task force meetings, the members coordinate efforts for the efficient operation and maintenance of the existing facilities, as well as discuss necessary components for inclusion in the phased design and construction of the new facilities. As an example of the successful enhancements, the task force identified new technology (CDS) for the improvement of operation & maintenance at the existing Tourmaline low flow diversion facility. Once installed, the CDS debris trap will prevent the interruption of diversion at the facility from excessive debris, at the same time significantly reducing labor costs.

#### Routine Inspection and Cleaning, Review of Activities

The following self-inspections processes will be performed at Operations Centers:

- Facilities will be inspected annually and cleaned as needed.
- Maintenance activities will be reviewed annually to verify that appropriate storm water BMPs and practices are being utilized.
- Report modifications and corrective actions identified during self-inspection to the Storm Water Program annually as part of the Program Assessment.



### Twenty-Four Hour Non-Storm Water Discharge Reporting

Certain non-storm water discharges, because of their nature or magnitude, require timely reporting to the Regional Board. A report will also be forwarded to the Storm Water Program for record keeping purposes. Non-storm water discharges that pose a significant threat to water quality or human health, will be evaluated by City staff against the “24-Hour Non-Storm Water Discharge Reporting Checklist”. A significant threat to water quality or human health is determined on a case-by-case basis and will be dependent on the type of pollutant, the degree of the violation (i.e. the amount of pollutant discharged into the municipal storm drain system), the proximity to receiving water bodies, the potential for exposure to the public, and the potential for environmental damage. Examples of discharges that will be reported include sewage spills and non-storm water discharges, such as a significant sediment load into Los Penasquitos Lagoon.

Where staff determines that discharges pose a significant threat to water quality or human health, the Storm Water Program or responsible City department will notify the Regional Board orally and by facsimile within 24 hours of the discharge event. Additionally, a written report of the event and follow up actions will be sent to the designated Regional Board contact for the Municipal Storm Water Permit, if needed, within 5 working days of the day the event was identified. A standard reporting form will be created by the Storm Water Program to be used by all City departments to facilitate consistency and maintain clear communication with the Regional Board. The report will contain the following information:

- Description of the event and it's cause;
- Duration of the event;
- Time the event is expected to continue if it has not been corrected;
- Steps taken to correct the non-storm water discharge event.

### **2.1.10.3 Phasing**

#### Year 1 (July 1, 2001 - June 30, 2002):

- Maintain existing low flow diversion facilities.
- Start Phase II Construction.
- Phase III Design.
- Prepare & submit annual activities report

#### Year 2 (July 1, 2002 - June 30, 2003):

- Maintain existing low flow diversion facilities.
- Construction of Phase II
- Construction of Phase III
- Phase IV Design.
- Prepare & submit annual activities report

#### Year 3 (July 1, 2003 - June 30, 2004):

- Maintain existing low flow diversion facilities.
- Phase IV Construction.
- Prepare & submit annual activities report

#### Year 4 (July 1, 2004 - June 30, 2005):

- Maintain existing low flow diversion facilities
- Prepare & submit annual activities report

#### Year 5 (July 1, 2005 - June 30, 2006):

- Maintain existing low flow diversion facilities.
- Prepare & submit annual activities report

Actual implementation of the activities listed above is dependent upon identification of funding in future yearly budgets and City Council approval.

#### 2.1.10.4 Annual Assessment

The following form is representative of the quantitative and qualitative measures that will be tracked by the Storm Water Program regarding the Low Flow Diversion System component in order to prepare the Jurisdictional Urban Runoff Management Program annual assessment. *These assessment factors and questions are presented for information only; some questions may be modified prior to each annual assessment period, and not all of the factors or questions below may apply to each component's responsible department(s).* Prior to each fiscal year, a tailored Annual Assessment Form will be distributed to responsible departments, and will include an Excel spreadsheet containing direct and indirect quantitative and qualitative measures similar to the example below. The Storm Water Program will provide a blank copy of the Annual Assessment Form and additional guidance to department management prior to the beginning of each fiscal year. Submission of this report will require department director approval.

#### **Program Assessment Form - Municipal Facilities Operations and Management – Low Flow Diversion System**

##### **QUANTITATIVE ASSESSMENT:**

Activity	Quantity	Units	Comments
Number of high priority municipal facilities		#	
Number of high priority municipal facilities targeted for inspection		#	Due to calendar-year vs. fiscal year, staffing, budget, etc., as well as Permit Section F.3.b.(6)(d), the number of sites targeted for inspection may be less than the actual number of sites.
Number of high priority municipal facilities inspected		#	Number of sites (not the number of inspections, which may or may not be the same).
Number of medium and low priority municipal facilities inspected		#	See above.
Quantity of material removed from MS4		tons	direct measure; report in tons.
Quantity of debris removed that could have enter MS4 (i.e. street sweeping, litter removal)		tons	direct measure; report in tons.

**QUALITATIVE ASSESSMENT:**

1. Describe the major accomplishments of this component over the past year.

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2. Summarize the educational and outreach activities conducted for this component over the past year to educate staff on water quality principles.

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3. Summarize new activities or improvements to be implemented next year as a result of your self-assessment.

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4. Other comments.

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**FINANCIAL ASSESSMENT:**

Estimated annual storm water expenditures:

Personnel Expenditures: \_\_\_\_\_

Non-personnel Expenditures: \_\_\_\_\_